Ch12 - Aggregate Demand in the Open Economy (The Open Economy in the Short Run)

- The model developed in this chapter is an open-economy version of the IS–LM model and called the Mundell–Fleming model.

Small Open Economy With Perfect Capital Mobility

- $r$ is determined by the world interest rate $r^*$
- *Since $r$ is fixed, fiscal and monetary policies will affect the IS and LM curves through the exchange rates*
- Even though in the long-run we assume output is fixed, in the short run (due to upward the sloping supply curve) we assume it may deviate from the long-run equilibrium
The Goods Market and the IS* Curve

- \( Y = C(Y - T) + I(r^*) + G + NX(e) \)

  - The net exports depends on the real exchange rate. The Mundell–Fleming model, however, assumes that the price levels at home and abroad are fixed, so the real and nominal exchange rate are proportional.

- When the nominal exchange rate appreciates foreign goods become cheaper compared to domestic goods, and this causes exports to fall and imports to rise, and lowers the aggregate income.

- The relation of the exchange rate and aggregate income is called the \( IS^* \) curve.
The IS* Curve: The IS* curve is derived from the net-exports schedule and the Keynesian cross. Panel (a) shows the net-exports schedule: an increase in the exchange rate from $e_1$ to $e_2$ lowers net exports from $NX(e_1)$ to $NX(e_2)$. Panel (b) shows the Keynesian cross: a decrease in net exports from $NX(e_1)$ to $NX(e_2)$ shifts the planned-expenditure schedule downward and reduces income from $Y_1$ to $Y_2$. Panel (c) shows the IS* curve summarizing this relationship between the exchange rate and income: the higher the exchange rate, the lower the level of income.

(a) The Net-Exports Schedule

1. An increase in the exchange rate...

2. ... lowers net exports, ...

3. $NX(e_2) \leftarrow NX(e_1)$

4. ... which shifts planned expenditure downward...

5. The IS* curve summarizes these changes in the goods market equilibrium.
The Money Market and the LM* Curve

- \( LM \) curve is derived from \( M/P = L(r, Y) \).

  - It assumes \( M \) is fixed by supply and \( P \) is also fixed in the short-run, and draws combinations of \( r \) and \( Y \) satisfying the equation written above.
  
  - Since \( r \) is fixed by the world interest rate in an open economy, the equation finds a fixed amount of income \( Y \).
  
  - This is to say \( Y \) is not affected by the exchange rate. Hence, the \( LM^* \) curve, which draws the relation of the exchange rate and aggregate income, is vertical.
The LM Curve. Panel (a) shows the standard LM curve [which graphs the equation \( M/P = L(r, Y) \)] together with a horizontal line representing the world interest rate \( r^* \). The intersection of these two curves determines the level of income, regardless of the exchange rate. Therefore, as panel (b) shows, the LM* curve is vertical.

1. The money market equilibrium condition...

2. ...and the world interest rate...

3. ...determine the level of income.
Combining the IS* and LM* Curves

- The level of income and the exchange rate at the intersection of curves satisfy the equilibrium both in the goods and the money markets.

- Hint: To understand the effect of economic policies on the equilibrium income and the exchange rate, think about their effects on domestic interest rates and foreign exchange markets.
A-) A Small Open Economy Under Floating Exchange Rates

Fiscal Policy

- A fiscal expansion in the form of an increase in government purchases or a decrease in taxes shifts the IS* curve to the right. This raises the exchange rate and reduces net exports but has no effect on income.
This is because given \( M \) and \( P \), the world interest rate \( r^* \) determines \( Y \), and this level of income does not change when fiscal policy changes.

**Loanable Funds Interpretation:**

- When government purchases increases, the interest rate tries to rise above the world interest rate \( r^* \), capital flows in from abroad.
  
  *Note: In the final part of our course we will cover the interest rate differentials and resulting capital flows between countries in more detail.*

- The capital inflow increases the demand for the domestic currency and exchange rate appreciates.

- This reduces net exports and offsets the effects of the expansionary fiscal policy on income.
Monetary Policy

- Suppose now that the central bank increases the money supply. Because the price level is assumed to be fixed, the increase in real balances ($M/P$) shifts the $LM^*$ curve to the right.
• As the money supply puts downward pressure on the domestic interest rate, capital flows out of the economy.

• The capital outflow increases the supply of the domestic currency in the market for foreign-currency exchange, the exchange rate depreciates, which stimulates net exports.

• Hence, in a small open economy, monetary policy influences income by altering the exchange rate rather than the interest rate.
Trade Policy

- Suppose that the government reduces the demand for imported goods by imposing an import quota or a tariff.

Because net exports equal exports minus imports, a reduction in imports means an increase in net exports. This is an increase in planned...
expenditure and thus moves the IS* curve to the right.

- Because the LM* curve is vertical, the trade restriction raises the exchange rate but does not affect income.

- Because a trade restriction does not affect income, consumption, investment, or government purchases, it does not affect the trade balance.

- Interpretation: Even though the shift in the net-exports schedule tends to raise NX, an import restriction decreases the demand of domestic consumers for the foreign exchange. This raises the relative demand for the domestic currency. Thus the domestic currency appreciates and the net exports fall.
B-) A Small Open Economy Under Fixed Exchange Rates

- In the 1950s and 1960s, most of the world’s major economies used fixed exchange rate regime. Today, there are still some countries (mostly developing) using it.

- The sole monetary policy is to keep the exchange rate at the announced level.

- Suppose that the US central bank (Fed) announces that it is going to fix the exchange rate at 100 yen per dollar. It would then stand ready to give $1 in exchange for 100 yen or to give 100 yen in exchange for $1.

- Hence, the Fed would need a reserve of dollars (which it can print) and a reserve of yen (which must have been purchased previously).
How a Fixed-Exchange-Rate System Works

- Suppose the exchange rate is 150 yen per dollar that is higher than 100 yen per dollar determined by the central bank. Arbitrageurs use their dollars to buy foreign currency in foreign-exchange markets and sell it to the domestic central bank for a profit. This process automatically increases the money supply and lowers the exchange rate.
Suppose the equilibrium exchange rate is lower than the fixed exchange rate. Arbitrageurs will buy dollars in foreign-exchange markets and use them to buy foreign currency from the Fed. This process reduces the money supply and raises the exchange rate.

Note: This exchange-rate system fixes the nominal exchange rate. If prices are flexible, as they are in the long run, then the real exchange rate can change even while the nominal exchange rate is fixed.
Fiscal Policy

- Suppose that the government stimulates domestic spending by increasing government purchases or by cutting taxes.
• This policy shifts the $IS^*$ curve to the right, putting upward pressure on the exchange rate (and on the interest rate).

• Arbitrageurs quickly respond to the rising exchange rate by selling foreign currency to the central bank, leading to an automatic monetary expansion. The rise in the money supply (in the base money) shifts the $LM^*$ curve to the right.

• Thus, under a fixed exchange rate, a fiscal expansion raises aggregate income.
Monetary Policy

- If CBs tries to increase the money supply, it puts downward pressure on the exchange rate and on the domestic interest rate.
- Arbitrageurs quickly respond to the falling exchange rate by selling the domestic currency to the central bank, causing the money supply and the $LM^*$ curve to return to their initial positions.
• Notes:

– A country with a fixed exchange rate can, however, conduct a type of monetary policy: it can decide to change the level at which the exchange rate is fixed.

– A reduction in the value of the currency is called a devaluation, and an increase in its value is called a revaluation.

– In the Mundell–Fleming model, a devaluation shifts the $LM^*$ curve to the right; it acts like an increase in the money supply under a floating exchange rate. A devaluation thus expands net exports and raises aggregate income. A revaluation does otherwise.
Trade Policy: A Trade Restriction

A tariff or an import quota shifts the $IS^*$ curve to the right. This induces an increase in the money supply to maintain the fixed exchange rate. Hence, aggregate income increases together with the net exports.
Policy in the Mundell–Fleming Model: A Summary

- Under floating exchange rates, only monetary policy can affect income. The usual expansionary impact of fiscal policy is offset by a rise in the value of the currency.

- Under fixed exchange rates, only fiscal policy can affect income. The normal potency of monetary policy is lost because the money supply is dedicated to maintaining the exchange rate at the announced level.
APPENDIX: A Short-Run Model of the Large Open Economy

- Remember that a large open economy can influence the world interest rates. A higher interest rate not only reduces investment, but also reduces the net capital outflow and thus lowers net exports

\[ IS^* : \quad Y = C(Y - T) + I(r^* + \theta) + G + CF(r) \]

\[ NX(e) = CF(r) \]

\[ LM^* : \quad M/P = L(r^* + \theta, Y) \]

- The new net-capital-outflow term in the IS equation, CF(r), makes this IS curve flatter than it would be in a closed economy. The more responsive international capital flows are to the interest rate, the flatter the IS curve is

- A Rule of Thumb: The large open economy is an average of the closed economy and the small open economy
A Short-Run Model of a Large Open Economy Panel (a) shows that the IS and LM curves determine the interest rate $r_1$ and income $Y_1$. Panel (b) shows that $r_1$ determines the net capital outflow $CF_1$. Panel (c) shows that $CF_1$ and the net-exports schedule determine the exchange rate $e_1$. 
Fiscal Policy

(a) The IS-LM Model

1. A fiscal expansion...

2. ...raises the interest rate, ...

(b) Net Capital Outflow

3. ...which lowers net capital outflow, ...

(c) The Market for Foreign Exchange

4. ...raises the exchange rate, ...

5. ...and reduces net exports.

A Fiscal Expansion in a Large Open Economy

Panel (a) shows that a fiscal expansion shifts the IS curve to the right. Income rises from \( Y_1 \) to \( Y_2 \), and the interest rate rises from \( r_1 \) to \( r_2 \). Panel (b) shows that the increase in the interest rate causes the net capital outflow to fall from \( CF_1 \) to \( CF_2 \). Panel (c) shows that the fall in the net capital outflow reduces the net supply of dollars, causing the exchange rate to appreciate from \( e_1 \) to \( e_2 \).
Monetary Policy

Panel (a) shows that a monetary expansion shifts the LM curve to the right. Income rises from $Y_1$ to $Y_2$, and the interest rate falls from $r_1$ to $r_2$. Panel (b) shows that the decrease in the interest rate causes the net capital outflow to increase from $CF_1$ to $CF_2$. Panel (c) shows that the increase in the net capital outflow raises the net supply of dollars, which causes the exchange rate to depreciate from $e_1$ to $e_2$. 

4. ... lowers the exchange rate, ...
5. ... and raises net exports.